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Military Reconnaissance Robot

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Abstract— *In today's world Indian border military force facing a huge destruction especially in border. Tensions rise between nuclear neighbors after deadly raid on army base close to disputed border. All the military organizations takes the help of military robots to carry risky jobs that cannot be handled manually by soldier. A great development in military robots when compare to military robots in earlier time. In this proposal, we make use of Robotic vehicle which helps to enter an area of higher risks, move and place wherever the object wants to go. Security systems uses sensor to detect intrusion. Vision based system is accurate and can be more reliable. Vision based machine learning system will be a good deal to this problem. Using the machine learning algorithm technique, motion detection is first done, if there is any detection, a bounding box will be made on that spot and then human recognition algorithm takes place. If the intruder match with the database of known personal data of the soldiers which was already stored by the officials. If there is no match in database, it will take a snapshot of the unknown intruder and with the help of internet or sat-link it will sends it to the server. From the server an alarm triggers using relay or buzzers and the snapshot will be sent to the soldiers nearby with the accurate distance using gps tracking system.*

Keywords— GPS, Hexapod, machine learning, object detection, raspberry pi.

I. INTRODUCTION

As we said above Indian border military force facing a huge destruction in Pakistan, china, Nepal, Bhutan, Myanmar, Srilanka and Bangladesh. Tensions rise between nuclear neighbours after deadly raid on army base close to disputed border with Pakistan. Highly trained militants on what are essentially suicide missions – died in the three-hour assault on the base at Uri late September and seven Indian soldiers killed in attack on army base, nagrota. Police say four gunmen also killed during early morning raid on nagrota army base in Indian-occupied Kashmir, near the militarized "line of control" that divides Indian Kashmir from the Pakistan-controlled side. The pathankot attack was a terrorist attack committed on 2 January 2016 by a heavily armed team which attacked the pathankot air force station, part of the western air command of the Indian air force. The recent news is almost many soldiers were killed by Pakistani army and merely about soldiers injured, some critically. If this situation continues, then there's going to be a massive destruction in Indian border line force.

Almost all the military organizations take the help of military robots to carry many risky jobs that cannot be handled manually by soldier. We have also seen a great development in military robots when compare to military robots in earlier period. At present, different military robots are used by many military organizations. This innovative system is made for operations which involve high risk for humans to enter, especially in some criminal case and may prove very beneficial for military area for spying purposes. This system makes use of robotic arm as well as robotic vehicle which helps not only to enter an area involving high risk. The whole system is controlled via android application. Thus this application involves robotic vehicle so that the system can be used to enter a high risk area, move and place whichever objects it wants to.

We the engineering students have created a border military line robot that prevents the massive destruction for human lives. This robot is used for spying enemy territories during critical situation at border line, especially monitoring the movements of enemies entering into our country without any breach. The robot is made small in size. So the robots can even send to the enemy's camp to monitor the movements.

II. LITERATURE SURVEY

In 2008,Md.Masum Billah, Mohiuddin Ahmed, and Soheli Farhana states that many walking robots were compared and advantages of hexapod systems against wheeled robots are described. These hexapod robots is mainly considered for efficient navigation method in different terrain using apposite gait of locomotion, which make it faster and at the same time energy efficient to navigate and negotiate difficult terrain. Hexapod is used for the purpose of disaster recovery. In any disaster, the elementary tasks at hand are: (i) to reach the affected field (ii) to find and get information about victims, and (iii) to rescue as many of them as possible. It is possible for the robot to reach any hazardous field unlike who have limited mobility in such missions. So that they preferred hexapod robot, which has the ability to move in all

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terrains and has more advantages over wheeled robots. This shows that legged robots can operate in both even and rough terrain. The hexapod provides additional DOF for the robot's sensors and on board equipment. The main application of robots in this mission has been concerned with the substitution of manual human labor by robots or mechanized systems to make the work more time efficient, accurate, uniform and less costly. In the hazardous field, it will rotate in any direction; heavy legs with powerful servo motors were chosen over other types as they can withstand heavy loads. It can move faster when it is in even terrain, and in uneven terrain, it will navigate very leisurely. They used two types of gaits to handle this terrain detection, 1.Tripod Gait for Even Terrain, 2.Wave Gait for Uneven Terrain.

In 2013,Graeme Best, Peyman Moghadam, Navinda Kottege, Lindsay Kleeman have discussed about the effectiveness of a legged robot's gait. It is highly dependent on the ground cover of the terrain it traversing. The robot is able to detect and classify the type of ground cover it is traversing. To achieve this they present a novel approach for ground cover classification which utilizes position measurements of the leg servos to estimate the errors between commanded and actual positions of each joint. In addition to this, they also employ a multi-class Support Vector Machine with a required dimensional feature space consisting of features in gait-phase and frequency domains. They have implemented this algorithm in the Robot Operating System (ROS).Humans naturally adjust their walking style according to the terrain they are walking on. This same logic is tried in these robots. In order to achieve this behaviour, it must have the ability to autonomously differentiate terrain types. For example amphibious legged robot, they change their behaviour by differentiating between sand and shallow water to determine when to switch from a walking to swimming gait. In this they have performed to types of terrain classification:1.Exteroceptive sensing, 2. Interactive sensing. Exteroceptive sensing based terrain classification algorithms use a variety of sensors like vision and range. Interactive sensing techniques, measure aspects of the interaction between the robot and the terrain as the robot moves through the environment. All of the terrain classification approaches in the previously mentioned studies require additional external sensors to the robot. But in this case, they propose a new approach that utilizes position sensors that come built into a hexapod robot's leg actuators and it does not require modifying the hardware of the robot. These robots are equipped with an Arduino microprocessor board and accompanying software that includes an open-loop gait engine. The data is then collected in real time by a laptop connected via a serial connection.

In 2013, M. Z. A. Rashid, M. S. M. Aras, A. A. Radzak, A. M. Kassim and A. Jamali explained the hexapod robot with manoeuvrable wheel is designed and developed. The purpose of this robot is to ease the movement either on the flat surface or on the inclined surface. This is quite different from the previous version; they have added an additional feature climbing. In flat surface, the robot will move using the manoeuvrable wheel, while in incline surface the robot will climb using its legs. This will be decided by the robot based on the sensory devices and algorithm developed at the controller attached to the robot. The study of this project is to develop a new hexapod robot which is quite different from the existing product in the market today. The main advantage in this robot is that they are with manoeuvrable wheel which is a combination of six legs robot and mobile robot. In this two types of robots are classified as mobile robots, which is either walking using its legs or manoeuvre using wheels. There are 8 designs available to construct this hexapod, they applied the best one here. The method is used to select the design based on House of Quality, the comparison between each design can be clearly determined. After the best design is chosen, the size and dimension of each part of the hexapod robot is determined so that it can be drawn using Solid works software. This design is analysed by using Solid work's simulation Xpress to calculate the displacement, strain, and stress of the system based on the material, fixtures, and loads. They used the controller to control the servomotor, which is a16 channel servo controller (SC16A). For the movement of the robot, Programmable Integrated Circuit is used and run through the programming Mikro C code. Every parts of these robot is analysed in this research to find either it is strong to hold on some force or pressure before the over-all parts were assembled. After the completion of all this analyses the robot is ready to perform its task.

In 2016, V.S.Mahadevan, J.Dhivya, T.Monisha, J.Geetha,R.Divya encompasses a study on the development of a walking gait for fault tolerant locomotion in unstructured environments. Quadra pod is a four-leg walking robot. It should be a micro robot, designed with manual control. It consists of hardware and software. Thus the parts contain arduino Nano (ATMEGA 328), servomotor, ultrasonic sensor, PIR sensor and wireless module. They have used this robot to detect the human in the disaster environment and also for detecting obstacles. Human detection and tracking is the main problems in computer field. It includes many advanced technology in different fields such as pattern recognition, automatic control, artificial intelligence and computer technology. At the same time in this robot they have used life detection and obstacle detection. Robots are becoming more and more visible in daily life, as

technological advancements make them capable of performing a variety of tasks. Walking robots become more advanced; they collect the information from various surroundings safely and complete their task. In this project they have used matrix environment software for scanning and the path is shown in MATLAB GUI interface. They have used arduino boards which are powered via Mini-B USB connection. Motions are captured using passive infrared sensor module. This robots are controlled manually, it can perform various movements like crawling, walking, forward , reverse etc., so that it is very useful to detect the people who were struck inside the buildings.

In 2012, Jialue Fan, Wei Xu, Ying Wu, and Yihong Gong used tracking as a learning problem of estimating the location of an object given in its previous location. Given a set of examples, we train convolution neural networks is to perform the estimation task. Different from other learning techniques, the CNNs learn spatial and temporal features. We introduce multiple path ways in CNN to fuse local and global information better. A creative shift-variant CNN architecture is designed so as to alleviate the drift problem when the distracting objects are similar to the target in cluttered environment. We employ CNN to estimate the scale for the accurate localization of some key points. These techniques are object-independent so that the given method can be applied to track other object. The capability of the tracker of handling complex situations is demonstrated in testing sequences. Convolutional neural networks, machine learning, visual tracking. OBJECT tracking is a fundamental problem in computer field. Traditional feature-based methods, such as those based on colour or motion blobs , perform tracking by maintaining a simple model of the target and adapting such a model over time. However, real situations in practice makes enormous challenges to these techniques: 1) over time, the object model can deviate from its original one, and 2) they do not have a discriminative model which distinguishes the object category of interest from others. In recent years, learning-based approaches and object-detection-based tracking methods have been used to overcome these limitations. In these methods, an online learning or a pre-trained detector provide object candidates, and then an additional module generates across frames. By adaptively updating Manuscript received. For recognition or detection tasks, the primitive feature detectors that are useful on one part of the image are likely to be useful across the entire image. By sharing the same set of weights, CNNs have the shift-invariant property so that they can achieve excellent performance in various recognition or detection tasks. The major challenge of the traditional learning-based and/or tracking-by-detection methods is the false positive matches that lead to wrong association of the tracks.

In 2006,T.D. Barfoot, E.J.P. Earon, G.M.T. D'Eleuterio have explained that the Spiders are examples of relatively simple creatures from nature which are able to successfully operate many legs simultaneously in order to navigate a diversity of terrains. However, the control algorithms for hexapod types of robot are quite complicated (e.g. dynamic neural networks), requiring heavy computations to be performed in real time. Here a simple approach which reduces such computations by using a coded control mechanism. As with dynamic neural network approaches, each leg of a robot is given its own controller. Communication between controllers is local(legs "talk" to their neighbours) resulting in a global behaviour(walking gait) for the robot. The controllers used here are cellular automata. Each leg is given its own cellular automaton (CA) which can be finite number of states .However, in a dynamic robot moving on a rough terrain, the requested leg action may not always be perfect. The input state of a leg could be either the basis behaviour or leg zone. By using basis behaviours, the leg controllers may entirely be discrete. The crucial step in this approach is the discovery of particular CA lookup tables which cause connected legs to produce successful walking gaits. The obvious first method is to design the local rules by hand. Another method is to develop an evolutionary global optimization technique, called genetic algorithm. One well established gait for hexapod robots is the "tripod "gait. The legs are divided into two sets

1. Forward Left, Center Right, Rear Left
2. Forward Right, Center Left, Rear Right

The robot has been mounted on an un-motorized treadmill to automatically measure the controller performance. As Kafka walks, the belt on the treadmill causes the rollers to rotate. The odometer measures net distance travelled. Decentralized controllers for spider robots offer a great deal of redundancy in that if one controller fails, the robot may still limp under the power of the remaining function all legs

In 2011, Dominik Belter, Piotr Skrzypczy´nski deals about the real time movement of the robot in rugged terrain. It proposes to employ several modules for planning the robot's path, collision avoidance, stability, etc. This says that, by using this method the robot can autonomously find the path to the desired position and discriminate between traversable and non-traversable areas. The backbone of this method is the rapidly exploring random trees concept. It is not possible for a remote operator to control a walking robot by defining the movement of each leg. When the robot walking on a rough terrain the task becomes much harder, so the control of the robot should provide more autonomous

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decision capabilities. Some researchers try to simplify the problem like number of combinations of robot's postures and leg movements in multi-legged robot. They achieved this by adapting existing 2D planning techniques to operate in 3D terrain, and followed by obtaining a path using a reactive controller. These approaches may generate quite conservative motion plans, which won't take full advantage of the locomotion capabilities of a legged robot. In this, the motion planning problem is decomposed into two main stages: an initial global planning stage and an execution stage. Because the space of foot step trajectory is high dimensional R algorithm, which combines aspects of deterministic and randomized search, is used for planning. The issues specifies a walking robot, e.g. foot path selection and stability maintenance are solved through specialized sub-routines within the main RRT-based planner. Thus, this approach is called "integrated". They use a kinematic configuration on rough terrain for wheeled or tracked robot. A stability criterion is rarely used for motion planning of wheeled robots. Therefore a static stability checking procedure is implemented to preserve balance and avoid unexpected falls.

In 2013, Henry A.Rowley,Shumeet Baluja, and Takeo Kanade explained to detect frontal face detection system. In this they use Bootstrap algorithm which add false detection into training sets. In this research, facial images can be characterized directly in terms of pixel intensities. Neural Network for facial detection is really a challenging, as it is difficult to differentiate the "NonFace" images. The bootstrap method reduces the size of the training set needed. As a step of first stage, a filter receives input of 20*20 pixel region and it generates the output from 1 to -1.It detects the presence and absence of a face. A Filtering algorithm is applied to a window of the image, then it pass through the neural network, which further checks whether the window contains face or not. Most faces are detected at multiple nearby positions or scales, while false detection occurs. This is done by many experimental results such as Sensitivity analysis, testing, etc. In order to detect the image, each pixel is divided into several sub images. The each sub-image in turn will go through the testing process with neural network. Here the images collected are scanned from photographs and digitized. This research can detect between 77.9% and 90% of a face as it only detects images and face. Whereas in Military Reconnaissance Robots, We use super resolutions for more accuracy of the image which is been captured during streaming.

Nick Vallidis explained the Mobile robots are finding their own way into a number of tasks for the humans. Such tasks include those which are extremely repetitive, , or need to be performed in hazardous environments. For these reasons many wheeled vehicles have been designed. More recently there has been an explosion of legged robot designs. Insects are much more capable of traversing varied terrain than any walking robot that has been built to date. Their walking is very hard, and they can be easily rectified, even when they commit make mistakes. The six legs are arranged on the body so as to minimize the overall dimensions of the body. This positioning means that the center leg on both the front and the rear of the body are located from the center line of the body. The gears have same size between the server motors and lower legs. Artificial neural networks provide the means of controlling the robot. They have the advantage that it is not necessary to find a model for the system one is controlling. Artificial neural networks find their own model, through training, which could have nothing to do with the way the system actually works. Another advantage is the possibility of distributing the computation over several hardware systems, thus further copying the control systems of biological walkers. As a result of our requirements, we chose to use a multi-layer, feed-forward network, using the back-propagation algorithm for learning. This also includes a momentum term, to aid in getting out of local minima.Here is the procedure for generating the training data:

1) Randomly select a position for the rear side.
2) Read tilt sensor and move front legs to move the body towards a level position.
3) Repeat step 2 until body is level
4) Record the beginning front leg position, beginning tilt, and final front leg position.

Leveling the body of Black Widow show itself to be a valid approach to improve the walking of legged robot. A result of leveling the body the robot's weight is distributed among the legs. The output would be the six new leg positions. the resulting network would only control the "down" positions of the gait used in the tests

Gunnar Ratsch,Friedrich miescher explained the machine learning concept was originated from the field of artificial intelligence, which is used for intelligent abilities of humans by machines. Learning is understood as inductive inference, where one Observes examples that represent incomplete information about some "statistical phenomenon". In unsupervised learning one typically tries to uncover hidden regularities or to detect anomalies in the data. Based on the above example, one is particularly interested to predict the answer for other cases before they are observed externally. Hence, learning is not only a question of remembering but also of generalization to some unseen cases. An important concept in machine learning is classification. where one attempts to build algorithms.

Pattern classification are divided into several sub-tasks:

1. Data collection and representation.
2. Feature selection or feature reduction.

3. Classification.

There are 3 classification algorithms, Although Machine Learning is a relatively young field of research, there exist more learning algorithms than I can mention in this introduction. The traditional technique also known as k-Nearest Neighbor Classification, Here the k points of the training data closest to the test point are found, but it is computationally expensive and requires a large memory to store the training data. The next technique is Linear Discriminate Analysis, computes the input space that minimizes within-class variance and maximizes the between class distance. The another important technique is decision tree These algorithms solve the classification problem by repeatedly partitioning the in-put space, so as to build a tree whose nodes are as pure as possible (that is, they contain points of a single class). Neural Networks are perhaps one of the most commonly used approaches to classification. Neural networks (suggested first by Turing [1992]) are a computational model inspired by the connectivity of neurons in animate nervous systems. The next main algorithm is large main algorithm Machine learning rests upon the theoretical foundation of Statistical Learning Theory which provides conditions and guarantees for good generalization of learning algorithms.

In 2015, Muhammad Umar Javed explained the robot is highly stable ,diverse in locomotion patterns. It consist of six legs covering two dimensional space. The hexapod robot has, by definition, six legs and is inspired by insects such as spiders. The driven system of hexapod requires some components like motors. There are different types of motors: DC motors, AC motors, brushless DC motors, stepper motors and servo motors. Servo motors used for walking giant like hexapod robot. Hexapod robot consists of six legs and each of these legs contains three servo motors that are attached to the three legs. Middle leg from both sides will be as same, but inner and outer leg sections come in left and right handed variety. Standard M4 bolts are used to bolt servo motors to sections of legs. We have to control 18 servo motors to provide 18 degree of freedoms to the hexapod robot and different sensors are also needed to be interface by the controller from which informations are collected and accordingly the servo motors are controlled. Programming done using Mat lab and the compiler for the Arduino board. Both software programs use simple programming language like C. Software carried on the robot of the Arduino board will be used to interpret the serial communication from Mat lab, and send the appropriate data to the servo control board.

In 2013,kunal borker ,Rohan gaikwad have presented a wireless controlled robot system for surveillance purpose. A robot is a machine capable of carrying a complex series of actions automatically, especially one program by a computer. The mobile robots can be classified into different types. The track robot is the robot that uses tracks to move around. In conventional robotics, the controlling and operation of robots is usually done by using RF [Radio Frequency] circuits. These circuits are widely used for control and working applications reliable to small range. The RF circuits consist of transmitter and receiver which are independent of each other. All the control signals and commands are sent via wireless medium in between transmitter and receiver. The robot is specially designed for surveillance purpose. The control mechanism is provided along with video facility. The video transmission is achieved through high speed image transmission. Initially, the robot will be equipped with an Android smartphone which will capture the scenario & will transfer the images to the server on which the user will be controlling and watching the live feed. The Android device, the creator of the video by camera and responsible for transmitting the video over the internet to the server. It also maintains communication with the server to ensure identification and video streaming. Since many image processing algorithms require high complexity cost, running these algorithms on a mobile client with responsive interactions is often infeasible.

Jurij Leskovec, Sentjo st Slovenia, Jure_ Leskovec ijs_si have explained how to identify and differentiate AI into working system and also to detect the objects. Here phantom is been used for determining their position in 3D using monochromatic stereo imagery. A wide concept of machine learning have been used to detect the human body shapes. For this we need certain requirements,

1.Use a stereo system to obtain sparse range data of ascene.

2. Determine when a new object enters the system .

3.Efficiently separate the object from the background.

4. Employ tracking algorithms to update the position of each object.

5. Use Machine Learning algorithms .

The procedure of detection of new objects consists of several steps. The range of the image is calculated first. The system then searches for any new objects in scene, so tracked objects are not detected as new in the scene. N random pixels in range image are checked to identify chunks of pixels closer to the camera. When a new object is detected new deformable contour is estimated close enough to the object's silhouette. For each object contour is fitted to the object's silhouette. After initialization for each image from the sequence the deformable contour fitting algorithm is applied. For the estimation of new contour of interest a previous fitted deformable contour is taken. This drastically decreases the cost of the execution of the algorithm because time between two consecutive images assume that the object cannot detected.

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In 2015, Manisha Joshi, Dolly Dhanwani, Nikhil Sidhwani, Tarun Mirani mainly proposed to provide a security to the human life. This robot is created to replace human and which is controlled by human itself. It is mainly used in areas where human cannot be sent or life of human is endangered. They have used video streaming to send some witness from the sites were it is send to. Their project incorporates as a spy robot based on embedded system having an obstacle detector and an advanced features integrated in that. Next the robot is more improvised in the sense that it provides self-defence system i.e. if we provide with an obstacle detector so that it can prevent from damaging itself. And the last the LCD display, which is attached to display the current directions the robot is taking. It can also help in transmitting various messages as well in encrypted formats. They perform functions analogous to human, but under human guidance i.e. as per command from his owner. This robot arm is made up of 7 metallic segments which are joined by 6 joints. This robotic arm is controlled by the computer in a way by rotating each individual stepper motors connected to each joints. This robot has 6 DOF i.e. it can move in 6 different directions. This project comprises of two major hardware sections i.e. transmitter and receiver section. The transmitter section is a remote like unit which is majorly comprises of switches and encoder section. This remote is used as a controlling unit to control the robots movement in various directions. This is controlled by the microcontroller which controls all the majorly activities of transmitting and receiving signals. They have used DC motors which, When DC voltage is applied to the motor, it starts rotating in a particular direction and while the polarity is reversed it rotates in another direction. Camera is incorporated in the receiver section where in it will display the videos or snapshots taken while travelling onto remote areas. It is connect with a particular Personal computer or laptop and prove live streaming or storing of videos and snapshots. As a whole this project can be used in security based systems with a moving camera installed into it.

In 2015 , Tolga Karakurt, Akif Durdu, and Nihat Yilmaz deals with the development of legged robots which has features for search and rescue operations. Different walking algorithms are designed for this purpose and tested their performance. These robots are affected by environmental conditions thus encountered conditions are minimized. However the investigations about the possibility of problems like accident, battery life is largely scaled. The robots are controlled via communications port on computer. The effectiveness of the robot is measured according to the performance on rough terrain through six legs. The robot which has three servo motors in each leg. These robots are electrochemical system which is capable of autonomous or pre-programmed tasks. The robot developed in this project can be used as search and rescue robots, space robots and discover robots. The main advantage of this robot is their small size and practical mobility with acceptable number of legs. This provides more controlled balance to the robot. Each leg of the robot has three degrees of freedom and provided with a three-axis force sensor. The robot contains 12 actuators each has a current sensor that can be used to detect forces to its movement and the control of system was performed with totally 6 motor. These mobile robots are efficient about their power resources and high performance, to achieve this weight of the materials used in the structure and control elements are also considered.

In 2012, Ashish Kumar Tiwari,Lashmikant Tiwari,Kuldeep Kumar tripathi and Garima Arora proposed that the concept of tracking GPS and metal object detection and also tracking of vehicle within our country. It provides the monitoring and controlling capability in the borders .By this concept a stranger can be easily identified or if any object crosses the border where no soldier can be reached. The area's can be easily identified by the satellite communication and GPS tracking. Object detection method is used to get the pictures of the particular area for identification of the strangers who has come about the details of the object. In borders, the area's are divided into different number of nodes, where each are in contact with each other of the main node. In the main node, the strangers are been identified. Using this we can identify the object and their movement and also the direction. Recently, the government of India has been planned for tracking the vehicles which carries illegal commodities within the country, also the vehicles which carries the explosive materials for industries and the missing vehicles due to terrorist attack.

In 2016, A.Arun Raja,R.nivedha,G.Niranjana devi, and V.Roobini used a security alert system that records the video wherever the motion is detected. It uploads the video to the external server and reports to the server via text message. Raspberry pi is a module which is used for capturing and detecting the motions. This device is connected in the central panel. The devices such as burglary alarm, fire alarm and surveillance camera are the most commonly used. It work whenever the alarm is triggered. In this paper, we have a triple layer architecture, first layer(motion detection),second layer(python scripts),third layer(actions are executed).In Raspberry Pi the PIR(passive infrared sensor) is connected as a general input output pins. We use an external SD card for the storage of the videos. In order to send and receive the messages internet connection is required. The video is stored in the Raspberry Pi whenever the server is not available. GPS is used for sending SMS alert.

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In 2015,Sneha sighn, Pradnya anap, yogesh Bhaigade, chavan explained about the surveillance security which is concerned as for important. Surveillance camera is widely used for commercial spaces, schools and hospitals, warehouses. Other challenging indoor and outdoor environments which requires high end cameras which PTZ now-a-days RFID are mostly used that are costly and also the security domain is expensive Raspberry pi is used because of the low cost single board computer . It follows the algorithm of face detection for real time video IP and PTZ camera are used for deliverance, But they are restricted due to their high cost. In this we use a raspberry pi with web camera for detection and to capture real-time videos. In open CV haar classifier algorithm was been proposed for the face detection. It is used for measuring the features for contrasting the nearby pixel groups.

Face detection algorithm can be done in 4 ways.

1Haar feature selection
2Creating integral images
3Adaboost training algorithm
4Cascaded classifier.

In this application we also use GSM module for extension of detection capabilities where patterns are not restricted to face.

In 2016 , R.Karan Kumar,Raju N were worried about their safety. Since there is an increase in the crime rates, because of these an huge increase in surveillance system. The system is widely used for monitoring and capturing of videos lively. It can fixed in home, office and any other remote areas, where the movement of people is less. Using raspberry pi, the system acts like a robot in LAN. It also requires the WIFI network. It uses python languages for coding. Recently IP is used widely by the people. Before the usage of IP, analogue IP was used because of their low budget and cost effective. Raspberry pi is a high resource software, so it is made easy for the live streaming and for the controlling of robot. Night vision is also available in raspberry pi. Not only vision detection, it can also detect “smoke detection” in case of potential crimes and potential fire. Night vision is applicable by the removal of IR filter from the web camera. Object can be detected by the background subtraction algorithm. The system identifies the object and sends a messages or triggers alarm to the informer that unauthorized person has been entered.

P.Arena, L.Fortuna, M.Frasca, L.Patane, M.Pavone used an six legged robot named "Gregor1"which describes the implementation of bio inspired robot. It controls both the structure and locomotion by the biological observation of a cockroach for their specialized leg function and self-stabilizing posture. We use the theory called "central pattern generator" for the control of locomotion. The fundamental aim is to artificially replicate the extraordinary agility of an cockroach. The implementation on the rear legs of an cockroach plays an crucial role in overcoming obstacle and payload capability. In this project the role of artificial CPG cellular neural network is done. The Robot Gregor 1 can walk and travel at the speed of 0.1 body length per second and negotiates the obstacles for nearly more than 170% of height from its mass centre. In the field of explorative robotics, the concept called "Mission capable legged robot" acquires an major increase in the interest. In this we concern about rare leg mechanism of the cockroach that plays a crucial role in overcoming obstacle. For the sprawled posture, Gregor 1 exhibits the stable posture with a high margin stability. In order to coordinate the robot actuators, the basic unit of adopted CPG with nonlinear oscillators are been coupled for a network. In this experiment, the speed, manoeuvrability, obstacle climbing capability and ever genetic performance of the robot is discussed.

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II. CONCLUSION

Thus from above references military reconnaissance robot can be made with the help of hexapod (a six legged gait) , an raspberry pi and usb camera used for reconnaissance purpose in military border. Vision is captured; it checks the database for reference about the soldiers. If the intruder matches with the database of known personal data of the soldiers it will be avoided. If there is no match with database, it will take a snapshot of the unknown intruder and with the help of internet or sat-link it will sends it to the server. The nearby soldiers will receive an alert or a snapshot along with the exact location of the intruder at present using gps. These robots are to be placed in an array fashion so that intruder will get caught in anyone of the robots. This reconnaissance robot will reduce the death rate of the soldiers in military border. It is a major life saving measures. This robot will also make our country proud and take our nation to the next level of innovative creations with no loss of soldiers.

REFERENCES

[1] Md.Masum Billah, Mohiuddin Ahmed, and Soheli Farhana,2008, Walking Hexapod Robot in Disaster Recovery.

[2] Graeme Best, Peyman Moghadam, Navinda Kottege, Lindsay Kleeman,Australasian conference on robotics and automation,dec 2013, Terrain Classification Using a Hexapod Robot.

[3] M. Z. A. Rashid, M. S. M. Aras, A. A. Radzak, A. M. Kassimand A. Jamali,International journal of advanced science and technology,dec 2013, Development of Hexapod Robot with Maneuverable Wheel.

[4] V.S. Mahadevan, J. Dhivya, T. Monisha, J.Geetha, R. Divya, Internatiional journal of engineering

https://dx.doi.org/10.22161/ijaers.4.2.10 *ISSN: 2349-6495(P) | 2456-1908(O)*

technology in CS and Electronics(IJETCSE),april 2016, Object detection and path tracking using quadrapod robot in unknown environment.

[5] Jialue Fan, Wei Xu, Ying Wu, and Yihong, IEEE Transaction on Neural Network, october 2012, Human Tracking Using Convolutional Neural Network.

[6] T.D. Barfoot, E.J.P. Earon, G.M.T. D'Eleuterio, International journal in Robotics and Autonomous System,2006, Distributed control for a hexapod robot.

[7] Dominik Belter ,Piotr Skrzypczy´nski,PrePrints of the world congress,september 2011, Integrated Motion Planning for a Hexapod Robot Walking on Rough Terrain .

[8] Henry A.Rowley,Shumeet Baluja, and Takeo Kanade,International journal of Autonomous Robots,january 2013, Neural network-based face detection.

[9] Nick Vallidis,International journal in Artificial neural networks, A Hexapod Robot.

[10] Gunnar Ratsch, Friedrich miescher,International journal,laboratory of max planck society, A Brief Introduction into Machine Learning.

[11] Muhammad Umar Javed,International journal on control and Robotics,august 2015, Wireless Hexapod.

[12] Kunal borker ,Rohan gaikwad,International journal of Advances in Electrical and electronics Engineering,2013, wireless controlled surveillance robot.

[13] Jurij Leskovec, Sentjo st Slovenia, Detection of Human Bodies using Computer Analysis of a Sequence of Stereo Images.

[14] Manisha Joshi, Dolly Dhanwani, Nikhil Sidhwani, Tarun Mirani,International journal of Engineering Research and Technology,January 2015, Intelligent Spy Robot.

[15] Tolga Karakurt, Akif Durdu, and Nihat Yilmaz,International journal of Machine learning and Computing,April 2015, Design of Six Legged Spider Robot and Evolving Walking Algorithms.

[16] Ashish Kumar Tiwari,Lashmikant Tiwari,Kuldeep Kumar tripathi and Garima Arora,International journal of Electrical and Electronoics Engineering,2012, Gps navigator.

[17] A.Arun Raja,R.nivedha,G.Niranjana devi, and V.Roobini,Asia pacific International journal of Engineering science,2016,An IOT based security alert system using Raspberry Pi.

[18] Sneha sighn, Pradnya anap, yogesh Bhaigade, chavan, International journal of Advanced Research in computer and communication and Engineering, february 2015, IP camera video surveillance using Raspberry pi.

[19] R. karan Kumar, Raju N, International journal of science, Engineering and Technology research, August 2016, Surveillance and live streaming system using Raspberry pi.

[20] P. Arena, L. Fortuna, M. Frasca, L. Patane, M. Pavone, P. Arena, L. Fortuna, M. Frasca, L. Patane, M. Pavone, Implementation and experimental validation of an autonomous hexapod robot.